Unit of Study Details

Credits: 6
Prerequisites: No assumed knowledge of Physical Sciences
Preparation: You may find it useful to have a Year 11 HSC Physics book as a reference

Teaching Staff Details

Unit of study coordinator: Dr. Helen Margaret Johnston
Room and building: Rm231 A28
Phone number: 9036 9259
Email: h.johnston@physics.usyd.edu.au
Arrangements for student consultation:
Please feel free to consult Physics staff during any class, especially Tutorials. If you want to set up a special consultation, please email or telephone to set a time.
Other staff:
John O’Byrne: john.obyrne@sydney.edu.au

What is the unit about

Rationale

EDUH 1017 is a core junior unit designed specifically for BEd (Secondary)(Health and Human Movement) students to provide a basic knowledge and understanding of concepts in mechanics. As you may not have studied physical sciences previously, a key focus will be to introduce the required language and methods using a context that is both interesting and useful. The course consists of two themes: Walking, Running and Jumping, and Ball Sports. We will examine these two themes with a minimum level of mathematics, introducing physical concepts as required to make observations, explanations and predictions. In addition, you will be introduced to basic experimental skills in the measurement of physical quantities and analysis of experimental data.

The goals of the unit might be summarised simply as
• understanding of a few key physical concepts,
• having some practical experience of how to make relevant measurements, and
• developing an ability to apply physical principles to understand sporting situations in the real world.

We hope you will develop a new view of situations in everyday life and sport - understanding why you need to shorten your stride when walking on a slippery surface, why a pole vaulter needs the pole in her jump, or how topspin makes a tennis ball bounce.

Graduate Teacher Standards

This unit addresses element 1 ‘Teachers know their subject content and how to teach that to their students’ through engagement in workshop activities and assessment tasks. Knowledge of NSW curriculum areas (particularly Body in Motion) are addressed in class and through assessment tasks 2, 3 and 5. Knowledge of ICT is also enhanced through the various video analysis exercise tasks used in Laboratory work. Throughout the unit,
examples and assessment tasks include components to enable and encourage students to work mathematically at an appropriate level as they interpret data related to sport and human movement. This includes the use of analytical techniques to measure and evaluate sporting performance. Element 6 ‘Teachers continually improve their professional knowledge and practice’ is addressed through activities and discussions within the tutorial workshops and labs.

**Desired outcomes**

As a result of successfully completing this unit of study students should be able to:

1. Demonstrate an understanding of the key concepts of mechanics relevant to sporting situations. These include measurement, velocity, acceleration, force, energy, collisions, springs and rotation. (1.1.1)
2. Demonstrate an understanding of the methods used to measure physical quantities of relevance to your future careers. In laboratories and workshop tutorials you will use a range of measurement instruments ranging from ruler and stopwatch to motion detectors, force probes and video analysis. (1.1.1, 1.1.4, 4.1.5, 6.1.4, 6.1.5)
3. Demonstrate an ability to apply the key concepts using basic mathematical skills to solve simple problems in areas of mechanics relevant to your future careers. We expect you to be able to use and interpret units, vectors, equations, trigonometry and graphs in a sports mechanics context. You will be asked to demonstrate your growing abilities in several assignments and workshop tutorials. (1.1.1, 6.1.5)
4. Demonstrate an understanding of how the key concepts and your evolving skills can be used to analyse simple situations in sport and human movement. You will learn to ‘model’ physical situations to reflect observations and make predictions. You will be asked to write a report describing the application of sports mechanics principles to real sporting situations. (1.1.1, 3.1.4, 6.1.5)

**Topics**

**Walking, Running and Jumping**

*Dr Helen Johnston, 12 lectures*

Walking and running is a common experience to just about everyone. What is the difference between walking and running? How fast can you walk? Long jump, high jump and pole vaulting are all competitive forms of the familiar jump. Jumping is also important in sports such as basketball, AFL, hurdles etc. How do we describe these activities? Covers concepts such as: time, distance, speed, acceleration, direction, force and energy.

**Ball Sports and Review**

*A/Prof. John O’Byrne, 13 lectures*

Balls are involved in many of the most popular sports in Australia. Balls can behave very simply as projectiles, or very strangely! How can we understand the motion of a spinning or a bouncing ball? Covers concepts such as: projectile motion, energy (again), elastic energy, collisions, drag, friction and rotation. Using mechanics to describe other sports. Preparation for final examination.
The Faculty of Education and Social Work requires attendance of at least 90 per cent of all seminars, workshops or lectures. Where a student is unable to attend at the required rate evidence of illness or misadventure may be required and the student may be required to undertake extra work. Students should discuss the circumstances of their absence(s) with the co-ordinator of the unit of study.

Students enrolled in any 6-credit point unit of study offered through the Faculty of Science (such as this one) should consider spending up to 12 hours per week on that unit during the 13 teaching weeks and the study vacation. In Sports Mechanics this involves:

- 25 one-hour Lectures that will include class discussions, physics and sporting demonstrations, computer simulations and video presentations.
  - There are 2 one-hour Lectures per week in Lecture Theatre 1 in the Physics Building. Lectures are on Tuesday at 11 am and Thursday at 11 am, beginning Tuesday 26 July. You should attend both lectures.
  - Lectures are recorded (computer display and audio) and uploaded to the unit eLearning pages.
- 10 two-hour Workshop Tutorials based on and supporting the lecture modules. You work in groups of four developing your understanding of concepts, mathematical and problem solving skills, and interacting with mechanics demonstrations.
  - There are 2 two-hour Workshop Tutorials per week in room 331 in the Madsen Building. Workshop tutorials start in the second week of semester – the week commencing Monday 1 August. You should attend only one Workshop Tutorial.
- 8 two-hour Laboratory sessions. You work in groups of four, with tutors to assist, on activities involving the use of a range of technical equipment (computers, motion detectors, force probes etc) to make measurements and conduct experiments. A Progressive Test on unit content will be held in one Lab session.
  - There are 2 two-hour Laboratory sessions per week in room 402 of the Carslaw Building. Laboratory sessions start in the second week of semester – the week commencing Monday 1 August. You should attend only one Laboratory session.
- Up to 6 hours per week of Independent Study. You are expected use this time to read through and understand your lecture notes, to seek out other references, to work through the assigned examples, to complete the assignments, and to study for the progressive test and the final examination.

You will be scheduled into classes by the University Timetabling system. If you attend classes regularly and involve yourself in all of these learning experiences, you will gain a good understanding of the course work. This will have a considerable impact on your exam preparation and performance.

Good study habits are also very important, but you need to find your own best way to study. We offer some suggestions on our Learning Physics web page (http://www.physics.usyd.edu.au/current/learningphysics.shtml) that can be applied to Sports Mechanics.
You should be aware that mathematical techniques such as algebra and trigonometry will be used during the unit, but no prior physics knowledge is assumed. Extra support for students can be provided if necessary.

## Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Content</th>
<th>Additional notes</th>
<th>Readings</th>
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</thead>
</table>
| Lectures: 1,2,3 Tutorials: 1,2,3 Labs: 1,2,4 | Distance, Displacement, Speed, Velocity | Specific objectives – after these lectures you should be able to:  
- Describe base physical quantities and how to measure them  
- Change measurement units to SI units  
- Identify possible uncertainties in measurements  
- Define the concepts of distance and displacement  
- Define the concepts of speed and velocity  
- Interpret a Distance/Time graph  
- Use an equation to calculate average velocity | Recommended exercises Question Sheet 1: 1 - 3  
Course Notes: Chapters 1,2  
Reference book: Chapter 3 pp 20-21 and Chapter 3 pp 13-18 |
| Lectures: 4,5 Tutorials: 1,2,3 Labs: 3,4 | Acceleration, Graphs of motion | Specific objectives – after these lectures you should be able to:  
- Define the concepts of average and instantaneous velocity  
- Interpret a Velocity/Time graph  
- Define the concept of acceleration  
- Use an equation to calculate average acceleration | Recommended exercises Question Sheet 1: 4 - 12  
Recommended exercises Question Sheet 2: 1 - 4  
Course Notes: Chapter 3  
Reference book: Chapter 3 pp 13-20, 28-31 |
| Lectures: 6,7,8,9 Tutorial: 4 Lab: 5 | Force | Specific objectives – after these lectures you should be able to:  
- Define the concepts of vectors and scalars  
- Calculate horizontal and vertical components of vectors  
- Define and apply the concepts of force, net force, mass and particle or point mass.  
- Identify the forces on a body, particularly weight. | Recommended exercises Question Sheet 2: 5 - 8  
Course Notes: Chapter 4  
Reference book: Chapter 3 pp 22-28 and Chapter 5 pp 64-71 |
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<thead>
<tr>
<th>Week</th>
<th>Content</th>
<th>Additional notes</th>
<th>Readings</th>
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</table>
|      |         | normal force, frictional force, tension.  
|      |         | • Draw a force diagram  
|      |         | • Use a force diagram to assist with force problems. |  |
| Lectures: 10,11,12  
Tutorials: 5,7,8  
Lab: 6 | Kinetic and Potential Energy | Specific objectives – after these lectures you should be able to:  
|      |         | • Define the law of conservation of mechanical energy, and apply it to various dynamical systems.  
|      |         | • Define concepts of kinetic energy and potential energy  
|      |         | • Describe various types of potential energy e.g. chemical, elastic and gravitational  
|      |         | • Describe energy transfer in a sporting activity | Recommended exercises Question Sheet 2: 8.5 - 13  
|      |         | Course Notes: Chapter 5  
|      |         | Reference book: Chapter 5 pp 99-101 |
| Lectures: 13,14  
Tutorials: 7 Lab: 7 | Projectiles | Specific objectives – after these lectures you should be able to:  
|      |         | • Describe the motion of a projectile in terms of its horizontal and vertical components  
|      |         | • Solve problems that include uniformly accelerated motion  
|      |         | • Draw vector diagram to show 2-D motion | Recommended exercises Question Sheet 2: 13.5 - 13.7  
|      |         | Course Notes: Chapter 6  
|      |         | Reference book: Chapter 3 pp 31-43 |
| Lecture: 15 | Springs | Specific objectives – after these lectures you should be able to:  
|      |         | • Define the concepts of elastic potential energy, Hooke’s Law and work  
|      |         | • Describe the action of muscles in terms of springs | Recommended exercises Question Sheet 2: none available  
|      |         | Course Notes: Chapter 7  
|      |         | Reference book: Chapter 5 pp 105-106 |
| Lectures: 16,17  
Tutorials: 8 Lab: 8 | Momentum | Specific objectives – after these lectures you should be able to:  
|      |         | • Understand that Impulse = change in momentum  
|      |         | • Apply impulse concept to throwing, hitting, absorbing shock  
|      |         | • Apply conservation of momentum and kinetic energy to collisions | Recommended exercises Question Sheet: 14 - 20  
|      |         | Course Notes: Chapter 8  
<p>|      |         | Reference book: Chapter 5 pp 63-64, 77-84 |</p>
<table>
<thead>
<tr>
<th>Week</th>
<th>Content</th>
<th>Additional notes</th>
<th>Readings</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>• Understand coefficient of restitution for a vertical bounce.</td>
<td>Recommended exercises Question Sheet: 21-27</td>
</tr>
<tr>
<td>Lectures:</td>
<td>Rotation</td>
<td>Specific objectives – after these lectures you should be able to:</td>
<td>Course Notes: Chapter 9</td>
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<tr>
<td>18,19,20,21</td>
<td></td>
<td>• Understand that torque generates rotation</td>
<td>Reference book: Chapter 6</td>
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<tr>
<td>Tutorials:</td>
<td></td>
<td>• Understand effect of two or more torques</td>
<td>pp111-121, 147-168</td>
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<tr>
<td>9,10</td>
<td></td>
<td>• Understand concepts of angular velocity and acceleration</td>
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<td></td>
<td></td>
<td>• Understand concepts of rotational inertia and how it affects rotational motion</td>
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<tr>
<td></td>
<td></td>
<td>• Understand angular momentum</td>
<td></td>
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<tr>
<td>Lectures:</td>
<td>Ball Sports</td>
<td>Specific objectives – after these lectures you should be able to:</td>
<td>Recommended exercises Question Sheet: none available</td>
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<tr>
<td>22,23</td>
<td></td>
<td>• Describe physical properties of balls, racquets and bats</td>
<td>Reference book: Chapter 5</td>
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<tr>
<td></td>
<td></td>
<td>• Understand effects of friction between ball and the ground or court</td>
<td>pp71-77, 85-95</td>
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<td></td>
<td></td>
<td>• Describe how spin is imparted to the ball</td>
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<tr>
<td>Lectures:</td>
<td>Review or</td>
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<tr>
<td>24, 25</td>
<td>Bring your own</td>
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<td>questions</td>
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**Assessment**

**Assessment policies**

All assessment in this Unit of Study occurs in conformity with the policies of the Faculty of Education and Social Work. This is outlined in the Handbooks and web-site of the Faculty of Education and Social Work. Please refer to this on such matters as:

- Marking and grading
- Questioning a mark
- Submitting an assignment
- Exams
- Seeking an extension
- Penalties for late submission of work
- Plagiarism and academic honesty
• Seeking special consideration
• Seeking leave of absence
• Student appeals process

All students enrolled in this Unit of Study are expected, without exception, to make
themselves familiar with these policies. They are available at the following web-site:
http://sydney.edu.au/education_social_work/current_students/assistance_forms/policies.shtml

All assignments must be submitted with the Faculty cover-sheet attached and filled out. This
is available either from the Office of the Faculty (Level 3, Education Building) or from the
Faculty of Education and Social Work web-site.

The University of Sydney has adopted severe but fair procedures for dealing with plagiarism.
It is imperative that students understand what constitutes plagiarism. The threat of being
accused of plagiarism is generally relieved by expert referencing of your assignments. If you
are not sure how to reference well, please refer to the publications of the Faculty mentioned
above, and in particular the following web-site:

### Assessment tasks in this unit of study

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<th>Outcomes</th>
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<td>Assignments</td>
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<tr>
<td>eLearning quizzes</td>
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<td></td>
<td>See submission instructions</td>
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<tr>
<td>Report Proposal</td>
<td>4</td>
<td>1 page</td>
<td>07-09-2012</td>
<td>1,2,3,4</td>
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<tr>
<td>Report</td>
<td>16</td>
<td>1500</td>
<td>12-10-2012</td>
<td>1,2,3,4</td>
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<td>Library Plagiarism Exercise</td>
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<tr>
<td>Laboratory Work</td>
<td>16</td>
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<td>See submission instructions</td>
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<tr>
<td>Progressive Test (in a Laboratory session)</td>
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<td>21-09-2012</td>
<td>1,3,4</td>
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<tr>
<td>Tutorials</td>
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<td></td>
<td>1,2,3,4</td>
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<tr>
<td>Final Exam</td>
<td>48</td>
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<td>See submission instructions</td>
<td>1,2,3,4</td>
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1. Assignments

**Due date for completion:** See submission instructions

**Submission instructions:**

Assignment due at 5pm on the following dates:

- Assignment 1 - Friday 24 August
• Assignment 2 - Friday 21 September
• Assignment 3 - Friday 26 October

Submit assignments in the slot in the counter in the Physics Student Office.

**Detail:**
Several questions and numerical problems.

Attach a Junior Physics assignment cover sheet (from eLearning page or Student Office). Do NOT use an Education Faculty cover sheet. Do NOT use a folder. Assignments may be handwritten and up to 3 students may work together to complete a single copy of the assignment.

**Assessment criteria:**
In this assessment, you will need to demonstrate an understanding of the key concepts of mechanics relevant to sporting situations. To do this you will need to:

• analyse the simple situations
• apply key concepts using basic mathematical skills
• solve problems in relation to sporting situations

Answers will be assessed relative to a marking scheme that has the correct numerical solutions to problems and model conceptual answers to questions. Where possible, marks are awarded for method as well as the correct answer.

**Additional notes:**
Assignments submitted late without permission will incur a 20% late penalty, with a further 20% penalty accumulating each week until the assignment is submitted.

Marked assignments are usually returned during lectures within two weeks. Uncollected assignments will be left in the trays in the Physics Student Services Office. Model solutions to all the questions or problems will be posted on the unit eLearning pages when the marked assignments are returned.

We encourage cooperation between students in completing assignments and allow 1, 2 or 3 students to hand in a single assignment. All students signing the assignment cover sheet certify that they have made a fair contribution to the attached work and are happy to receive the same mark. We will NOT accept assignments that are simply copied. Copying the work of another person without acknowledgment is plagiarism. Allowing your work to be copied is unfair to other students and ultimately does not help the student copying your work.

2. eLearning quizzes

**Due date for completion:** See submission instructions

**Submission instructions:**
These quizzes will be conducted on-line via the eLearning system. Due dates will usually be immediately before the Tuesday lecture near the beginning of every week.

**Detail:**
Quizzes will consist of 3 or 4 multiple choice questions, intended to test your understanding of material to be covered in the lectures in the coming week. Answers will be apparent from the relevant sections of the Course Notes.

**Assessment criteria:**

*Sports Mechanics*
In this assessment, you will need to demonstrate comprehension of the key concepts of mechanics relevant to lectures. Marks are awarded for completion of the task with a majority of correct answers.

3. Report Proposal

**Due date for completion:** 07-09-2012

**Submission instructions:**
Submit report proposals in the slot in the counter in the Physics Student Office.

**Detail:**
Your Report should analyse a well defined sporting situation in terms of sports mechanics concepts. You must present your results and describe in detail how you would measure important physical quantities describing the motion. To get you thinking carefully about this early, you are required to submit a Report Proposal.

Your Report Proposal should outline in 1 page or less:

- your topic and its limits (e.g. describing a tennis ball’s motion as it leaves the racquet, but not the motion of the racquet itself)
- the major points you expect to make in some detail - we recommend a simple list of dot points.
- major figures you will include and why – e.g. a force diagram of all forces on the ball to explain the subsequent direction of motion.
- some major references – each with a very brief description of what it contains

Attach a Report Cover Sheet cover sheet (from eLearning page or Student Services Office). Do NOT use an Education Faculty cover sheet. Do NOT use a folder. The Report Proposal must be typed and students must submit a proposal individually.

**Assessment criteria:**
In this assessment, you will need to:

- analyse a sporting situation and identify the key mechanics concepts
- demonstrate relevant mathematical skills
- identify and describe appropriate methods to measure physical quantities of relevance to the situation.

We will expect clear evidence of reading beyond the recommended reference book and incorporation of this material into your discussion. Simple copying of material is unacceptable. A detailed set of assessment criteria is included on the Cover Sheet.

**Additional notes:**
This Proposal is intended to get you thinking carefully about the topic, limits and structure of your final Report. Feedback on this Proposal should allow you to clarify the topic and improve the structure of your Report.

4. Report

**Due date for completion:** 12-10-2012

**Submission instructions:**
Submit reports in the slot in the counter in the Physics Student Office.

**Detail:**

Analyse a well defined sporting situation in terms of sports mechanics concepts. Your report must present your results and describe in detail how you would measure important physical quantities describing the motion.

The final Report itself should be 1500 words of text (3 to 4 pages, not including the abstract, references and diagrams). Attach a Report Cover Sheet cover sheet (from eLearning page or Student Services Office). Do NOT use an Education Faculty cover sheet. Do NOT use a folder. The Report must be typed and students must submit a report individually.

**Assessment criteria:**

In this assessment, you will need to:

- analyse a sporting situation and identify the key mechanics concepts
- demonstrate relevant mathematical skills
- identify and describe appropriate methods to measure physical quantities of relevance to the situation.

We will expect clear evidence of reading beyond the recommended reference book and incorporation of this material into your discussion. Simple copying of material is unacceptable. A very detailed set of assessment criteria is included on the Cover Sheet.

**Additional notes:**

This Report requires you to think carefully about the topic, not merely copy other material. You need to decide the limits of your topics and the structure of your final Report. Feedback on your Proposal should help you to clarify the topic and improve the structure of your Report.

**5. Library Plagiarism Exercise**

**Due date for completion:** 07-09-2012

**Submission instructions:**

The printed certificate of completion should be submitted for recording in a Laboratory session by the end of Week 6, when the Report Proposal is due - at the latest.

**Detail:**

All students must complete an on-line exercise describing Plagiarism and academic honesty. This exercise is located at [http://www.library.usyd.edu.au/elearning/learn/plagiarism/index.php](http://www.library.usyd.edu.au/elearning/learn/plagiarism/index.php). A digital certificate of completion must be saved and printed after completing the exercise and taken to the Lab session.

**Assessment criteria:**

This is a simple on-line exercise that must simply be completed to ensure you have a basic understanding of Plagiarism and academic honesty.

**6. Laboratory Work**

**Due date for completion:** See submission instructions

**Submission instructions:**
Laboratory work is done in the Physics laboratories on Friday mornings. For each laboratory session, you are awarded a mark for successfully completing each checkpoint.

**Detail:**
There are 8 Laboratory sessions to complete. A full description of each activity is provided in the *EDUH 1017 Sports Mechanics Laboratory Manual*, available at the Co-op Bookshop (NOT the Copy Centre!). The manual also serves as a record of what you have done since all results are recorded in your own manual.

**Assessment criteria:**
In this assessment, you will need to:
- demonstrate an understanding of the key concepts of mechanics as applied to each laboratory experiment.
- consider how the key concepts are relevant to each experiment
- apply basic mathematical and ITC skills to analyse and report on the mechanics of the situation
- demonstrate an ability to measure physical quantities using the equipment provided in each experiment.

Assessment in the laboratory is based on successful completion of laboratory work. For each laboratory session, you are awarded a mark for successfully completing each checkpoint.

7. **Progressive Test (in a Laboratory session)**

**Due date for completion:** 21-09-2012

**Submission instructions:**
The test will be conducted in your normal Laboratory session.

**Detail:**
Three questions and numerical problems, intended to give you experience of exam-style questions in exam conditions and give you some feedback on how your understanding of the course material is developing. The Test is conducted under exam conditions and lasts for 40 minutes.

**Assessment criteria:**
In this assessment, you will need to demonstrate an understanding of the key concepts of mechanics relevant to sporting situations. To do this you will need to:
- analyse the simple situations
- apply key concepts using basic mathematical skills
- solve problems in relation to sporting situations

Answers will be assessed relative to a marking scheme that has the correct numerical solutions to problems and model conceptual answers to questions. Where possible, marks are awarded for method as well as the correct answer.

8. **Tutorials**

**Due date for completion:**
Submission instructions:
Tutorials are conducted in two sessions per week.

Detail:
Contributing to Workshop Tutorials is an important part of success in this Unit of Study. We measure your contribution by collecting group answer sheets and assigning an overall mark for your work during the semester, up to 4% of your final grade. To obtain full marks you must participate in at least 8 out of the 10 tutorials.

Assessment criteria:
In this assessment, you will need to demonstrate an understanding of the key concepts of mechanics relevant to sporting situations. To do this you will need to:
- analyse the simple situations
- apply key concepts using basic mathematical skills
- solve problems in relation to sporting situations

Additional notes:
Note that you should bring your own calculator to the tutorials.

9. Final Exam

Due date for completion: See submission instructions
Submission instructions:
The Final Exam will be held as part of the normal end or semester examinations organised by the University. Details will be available from your MyUni page during October.

Detail:
A two-hour examination covering the material included in the unit of study is held at the end of the semester. You will be asked to write descriptive answers to questions, to explain physical principles and to answer quantitative questions, all aimed at demonstrating your progress in achieving the goals of the unit.

Assessment criteria:
In this assessment, you will need to demonstrate an understanding of the key concepts of mechanics relevant to sporting situations. To do this you will need to:
- analyse the simple situations
- apply key concepts using basic mathematical skills
- solve problems in relation to sporting situations
- describe methods to measure physical quantities in a given sporting situation

Answers will be assessed relative to a marking scheme that has the correct numerical solutions to problems and model conceptual answers to questions. Where possible, marks are awarded for method as well as the correct answer.

Additional notes:
### Grading criteria

<table>
<thead>
<tr>
<th>HD</th>
<th>Dist</th>
<th>Cr</th>
<th>Pass</th>
<th>FAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Organisation &amp; conceptualization of assessment task</strong></td>
<td>Consistently strong and ongoing demonstration of very good organisational and conceptual skills. The work is well conceived, coherent, logical and lucid as well as professionally prepared</td>
<td>Strong organization &amp; conceptual skills and evidence that the task is logical and coherent and professionally prepared</td>
<td>Demonstrates task organization and conceptual understanding in a style which is mostly logical, coherent and flowing</td>
<td>Attempts are made to demonstrate a logical &amp; coherent understanding of the assessment task but some aspects may be confused or undeveloped</td>
</tr>
<tr>
<td><strong>Subject/discipline content &amp; knowledge</strong></td>
<td>Thorough and comprehensive understanding of the content and/or discipline gathered from a wide range of current &amp; relevant sources beyond the core materials</td>
<td>Considers topics and issues in the broader disciplinary context. Evidence of having read current and relevant sources beyond the core materials</td>
<td>Clear understanding of topic. Demonstrates understanding of materials presented in core texts and readings</td>
<td>Adequate understanding of topic. Demonstrates evidence of having read material presented in core texts and readings</td>
</tr>
<tr>
<td><strong>Clarity of expression (including accuracy, spelling, grammar, punctuation, use of language, expression of ideas)</strong></td>
<td>Fluent and succinct communication style appropriate to the assessment task. Grammar, spelling, use of language and punctuation is appropriate and accurate. Reflects Faculty’s style guide (refer ‘little blue book’)</td>
<td>Communication is mainly clear, fluent and appropriate to document. Grammar, spelling, use of language and punctuation is accurate. Reflects Faculty’s style guide (refer ‘little blue book’)</td>
<td>Communication is appropriate to the assessment task and is mostly fluent and clear. Grammar, spelling, use of language and punctuation mostly accurate. Reflects Faculty’s style guide (refer ‘little blue book’)</td>
<td>Meaning apparent but not always fluently or clearly communicated. Grammar, spelling, language and/or punctuation may display minor errors. Some evidence of applying faculty’s style guide</td>
</tr>
<tr>
<td><strong>Communication &amp; presentation (written &amp;/or oral &amp;/or visual)</strong></td>
<td>Communicates effectively using a variety of relevant, imaginative, fluent and professional presentation styles and communication methods. Evidence of deep reflection on the presentation. Respectful of diverse backgrounds &amp; experiences</td>
<td>Uses a variety of discipline-appropriate formats to communicate confidently &amp; effectively. Evidence of reflection on the presentation. Demonstrates sensitivity to diverse backgrounds &amp; experiences</td>
<td>Communicates competently in a variety of formats appropriate to the discipline and report procedures in a structured manner using relevant information. Evidence of sensitivity to diverse backgrounds &amp; experiences</td>
<td>Communicates competently in a variety of formats appropriate to the discipline with some display of structure. May demonstrate some limited sensitivity to diverse backgrounds &amp; experiences</td>
</tr>
<tr>
<td><strong>Problem solving</strong></td>
<td>Solves or argues possible solutions to complex problems and addresses challenging tasks/situations using imagination/creative and from a variety of perspectives</td>
<td>Solves complex problems and addresses challenging tasks/situations using creative techniques and skills</td>
<td>Solves problems using imagination and a limited range of creative techniques</td>
<td>Demonstrate basic skills for solving simple problems. Demonstrates limited ability to develop innovative methods for solving problems and presenting solutions</td>
</tr>
<tr>
<td><strong>Referencing</strong></td>
<td>Uses recommended referencing style consistently and accurately in text of work and reference list. Effective use of relevant quotations</td>
<td>Uses recommended referencing style consistently and accurately in text of work and reference list. Effective use of relevant quotations</td>
<td>Uses recommended referencing style with minimal errors. Effective use of relevant quotations</td>
<td>Referencing is mainly accurate. Ineffective use of quotations</td>
</tr>
<tr>
<td><strong>Data/information gathering/processing/data analysis/evaluating</strong></td>
<td>Selects &amp; processes data appropriate to confidence &amp; imagination. Accurate, reliable systematic collection and processing of data. Appropriately selects &amp; processes data &amp; uses relevant tools Some application of theory to analysis</td>
<td>Selects appropriate data &amp; processes using relevant tools Some application of theory to analysis</td>
<td>Makes a reasonable selection from data &amp; applies processing tools</td>
<td>Collects some information &amp; makes some use of processing tools</td>
</tr>
</tbody>
</table>
Student evaluation

We welcome feedback on this Unit of Study. Please take the time to offer constructive written feedback at the end of the semester. The teaching team is committed to the participation of learners in the process of planning and evaluation of courses. The following changes have already been made to this Unit of Study as a result of student feedback:

No significant changes have been made this year. However, the eLearning Quizzes are relatively new and are evolving on the basis of student feedback.

Formal feedback to lecturers is available through questionnaires and through representatives at the Junior Physics staff-student liaison meeting. However, you should also feel free to talk to any of the staff at any time.

Other notes on this unit of study

Grades

Final grades in this unit are awarded at levels of HD (High Distinction), D (Distinction), CR (Credit), P (Pass) and F (Fail) as defined by the Academic Board Assessment Policy. These achievement levels are described below. Details of the policy are available on the University’s Policy website at http://sydney.edu.au/policies/.

High Distinction (HD)

At HD level, a student demonstrates a flair for the subject and comprehensive knowledge and understanding of the unit material. A ‘High Distinction’ reflects exceptional achievement and is awarded to a student who demonstrates the ability to apply subject knowledge to novel situations.

Distinction (D)

At D level, a student demonstrates an aptitude for the subject and a solid knowledge and understanding of the unit material. A ‘Distinction’ reflects excellent achievement and is awarded to a student who demonstrates an ability to apply the key ideas of the subject.

Credit (CR)

At CR level, a student demonstrates a good command and knowledge of the unit material. A ‘Credit’ reflects solid achievement and is awarded to a student who has a broad understanding of the unit material but has not fully developed the ability to apply the key ideas of the subject.

Pass (P)

At P level, a student demonstrates proficiency in the unit material. A ‘Pass’ reflects satisfactory achievement and is awarded to a student who has threshold knowledge of the subject. Assessment tasks are moderated to ensure their appropriateness, their consistency
with the achievement level descriptors below and equity of grade distributions across the units offered by the Faculty of Science.

In this unit the final mark is calculated by adding all the individual assessment marks with the appropriate weightings and then applying moderation to match Science faculty guidelines. This final moderation isn't normally very great, but it does mean that you can't simply add all your individual marks and get your final mark.

**Web Resources**


**Email**

The University provides you with email access based on your username. We may use this email address to provide you with important information regarding this unit of study. **We expect you to periodically read your University email account or forward mail to an email account you do read (eg. a gmail account).**

**Where to go for help**

If you need help, you can

- as a first step, always check your unit eLearning pages for information, documents and links
- ask other students using the Discussion Board on the unit eLearning page.
- go to the Physics Student Support Office, Room 210 in the Physics building, phone 9351 3037.
- ask your lecturer or tutor
- ask the unit Coordinator - Dr Helen Johnston - email h.johnston@physics.usyd.edu.au
- consult one of the many services provided by the University, such as the Maths Learning Centre. These can be found by choosing Junior Physics Resources and Links from the unit WebCT page or your MyUni pages (http://myuni.usyd.edu.au/).

**Academic Dishonesty/Plagiarism**

We will NOT accept assessments that are simply copied. Copying the work of another person without acknowledgment is plagiarism and contrary to University policies on Academic Dishonesty and Plagiarism [http://sydney.edu.au/policies/showdoc.aspx?recnum=PD0C2012/254&RendNum=0](http://sydney.edu.au/policies/showdoc.aspx?recnum=PD0C2012/254&RendNum=0)

Academic Dishonesty means seeking to obtain or obtaining academic advantage (for example, in assessments) by dishonest or unfair means or knowingly assisting another student to do so. Academic Dishonesty includes, but is not limited to:

1. recycling – that is, the resubmission for assessment of work that is the same, or substantially the same, as Work previously submitted for assessment in the same or in a
different unit of study (except in the case of legitimate resubmission with the approval of the examiner for purposes of improvement);

2. fabrication of data;

3. the engagement of another person to complete or contribute to an assessment or examination in place of the student, whether for payment or otherwise or accepting such an engagement from another student;

4. communication, whether by speaking or some other means, to other candidates during an examination;

5. bringing into an examination forbidden material such as textbooks, notes, calculators or computers;

6. attempting to read other student’s work during an examination;

7. writing an examination or test paper, or consulting with another person about the examination or test, outside the confines of the examination room without permission;

8. copying from other students during examinations;

9. Inappropriate use of electronic devices to access information during examinations.

Plagiarism means presenting another person’s work as one’s own work by presenting, copying or reproducing it without acknowledgement of the source. Plagiarism is a form of Academic Dishonesty, but is treated separately. Plagiarism includes presenting work for assessment, publication, or otherwise, that includes:

1. phrases, clauses, sentences, paragraphs or longer extracts from published or unpublished work (including from the Internet) without acknowledgement of the source; or

2. the work of another person, without acknowledgement of the source and presented in a way that exceeds the boundaries of legitimate cooperation.

Consideration of factors affecting your study

If your academic performance in a Science Faculty unit of study is adversely affected by illness or some other serious event, such as an accident, you should notify the Faculty of Science Student Information Office (level 2 of the Carslaw building) within 7 days after the period for which consideration is sought, by completing an Application for Special Consideration with accompanying documentation. This is especially important if you miss an examination.

If you have another reason for the Science Faculty to take account of your circumstances - religious commitments, legal commitments (e.g. Jury duty), elite sporting or cultural commitments (representing the University, state or country), or Australian Defence Force commitments (e.g. Army Reserve) - you should notify the Faculty of Science Student Information Office (level 2 of the Carslaw building) at least 7 days BEFORE the period for which consideration is sought, by completing an Application for Special Arrangements with accompanying documentation.

These two forms of Consideration should cover most allowable circumstances. However, if you have another reason for requiring the School of Physics to take account of your circumstances, you should notify the School of Physics Student Office (room 202 in the Physics building) immediately.

You should not submit an application of any type if

1. there is no assessment associated with a missed class, or
2. you have a reasonable opportunity to make up any work you missed.

If, for example, you miss an assignment, an application for appropriate Consideration is required to allow late submission, but we do expect the assignment to be submitted. Sometimes catching up may be impossible, in which case we will consider a pro-rata adjustment of your marks on the basis of an application for Consideration.

**Special Consideration or Special Arrangements**

To submit an application for Special Consideration or Special Arrangements you should:

1. Obtain the appropriate Application pack from the Student Information Office of the Faculty of Science, the Faculty website at http://sydney.edu.au/science/cstudent/ug/forms.shtml, or the Physics Student Office.

2. Complete the forms and obtain whatever original documentary evidence is appropriate. Note especially that the Professional Practitioner's Certificate is essential for Special Consideration on grounds of serious illness - Medical Certificates will NOT be accepted.

3. Take the original copy of all forms and documents, plus sufficient copies for each unit of study affected and yourself, to the Faculty of Science Student Information Office (NOT any other Faculty Office if you are seeking Consideration in a unit taught by Physics). They will sign/stamp both the original application form and the copies. In the case of Physics units, one copy of the documentation must then be submitted to the Physics Student Office. Keep one copy yourself. A formal decision on your application will be sent to your university email address within 14 days.

Students unsure what type of Consideration is appropriate, or unhappy with a Consideration decision, should consult the Physics Student Services Office.

Further details on University policy regarding Considerations can be found in the Academic Board Assessment Policy. This document also contains details on other aspects such as Student Appeals against academic decisions.

For full details of applicable university policies and procedures, see the Policy web site at http://sydney.edu.au/policy.


**References and readings**

**Lecture Notes**

A separate set of Course Notes prepared by the School of Physics is available for purchase at the Co-op Bookshop (NOT the Copy Centre!). They are also available from the unit WebCT web pages. You will be expected to read these Notes.

**Recommended reference book**


**Laboratory Manual**

The laboratory segment of the unit is covered by *EDUH 1017 Sports Mechanics Laboratory Manual*, prepared by the School of Physics, available at the Co-op Bookshop (NOT the Copy Centre!). This Manual is required by all students.